

## CHAPTER 2

### BASIC DESIGN CONCEPTS

#### 2-1. General.

a. Fire protection water supply. The fire protection water supply consists of that needed to simultaneously control and extinguish fire in the subject facility and to protect exposed facilities. It includes the water necessary for fire department hose streams and for automatic sprinkler or special fire suppression systems. The water for fire department hose streams should be available from fire hydrants according to spacing requirements in EM 1110-3-164. The water for automatic sprinkler or special fire suppression systems must be available at the point where those systems are connected to the water supply systems.

#### b. Fire protection water supply sources.

(1) The water supply necessary to meet the required fire flow demands as developed in chapters 3 and 4 may usually be provided by the following sources:

(a) A municipal water supply system with elevated storage or pumping capacity which is capable of simultaneously meeting the domestic/industrial peak daily demands and the required fire flow demand.

(b) An individual facility process water supply system which is capable of simultaneously meeting the peak daily industrial demand and the required fire flow demand.

(2) If these sources cannot supply the required fire flow demand simultaneously with domestic/industrial demands, alternate fire protection water supply sources need to be developed.

c. Alternate fire protection water supply sources. There are several ways of developing alternate fire protection water supplies. Examples of such alternate sources are:

(1) An individual facility fire protection water supply system capable of independently meeting the required fire flow demand (such as an elevated storage tank or a fire pump and ground level reservoir).

(2) An individual facility fire protection water supply system which will supplement the water supply available from a municipal or process water supply system so that the combined systems can provide the required fire flow demand simultaneously with the domestic/industrial demands. Examples of such systems would be an

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elevated storage tank, a pressure tank, or a fire pump and ground level reservoir.

(3) Fire pumps taking suction from the municipal water supply system or from a process water supply system when that system has adequate volume capacity but insufficient pressure capacity to simultaneously supply the domestic/industrial demands and the required fire flow demands.

d. Required residual pressure. The minimum residual pressure will be 20 psi.

2-2. Guide for the use of this manual.

a. Required fire flow. Chapter 3 discusses developing the required fire flow demand for individual buildings and chapter 4 for developing the required fire flow demand for petroleum, oils, and lubricants (POL) storage and handling facilities, general outdoor storage areas, and vehicle parking facilities.

b. Fire flow demand application. The water supply system needs to be capable of supplying the largest single required fire flow demand when multiple facilities are being considered. The individual facility fire flow demands are not cumulative.

c. Limiting consideration for fire flow demand. When the required fire flow rate exceeds 2,500 gpm, a benefit/cost analysis should be conducted to determine if additional fire protection systems or if a change in the construction type or use of a facility is more cost effective than providing the required fire flow rate. Such changes may reduce the required fire flow rate to a point where it can be more economically provided.

d. Alternate fire protection systems. Chapter 5 discusses alternate sources for fire protection water supply and requirements for any needed pumping stations in cases where inadequate water supplies exist.